

CHERIAN

PATENT APPLICATION NO.: 10/765,772

Oriented Connections For Leadless and Leaded Packages

RESPONSE to OFFICE ACTION DATE MAILED 05/22/2006

**Page 5** of 50**IN THE CLAIMS****SUMMARY:**

Please amend the claims as follows:

- a) Cancel all claims 1 through 37
- b) Add the new claims 38 through 58.

**DETAILS:**

1 (Cancelled). A solder pad, hereinafter referred to as pad, similar to those solder pads that are used to mount electrical or electronic components or devices, hereinafter referred to as device(s), onto substrates or printed circuit boards, hereinafter referred to as PCB(s), wherein

a) said pad is formed in a certain shape, so as to control the shape and cross-section of the solder connection or solder joint that will be formed on top of it, between said device pad and said PCB pad.

2 (Cancelled). Pads, as in Claim 1, wherein

a) said pad on the PCB, hereinafter referred to as PCB pad, and its corresponding pad on the device, hereinafter referred to as device pad, both have a similar shape, to make a "matched pair or a matched set of pads".

3 (Cancelled). Pads, as in Claim 1, wherein

a) said pad on the PCB (PCB pad) and its corresponding pad on the device (device pad), both are elongated, i.e. the pad length is larger than the pad width, in order to get the solder joint to have an elongated cross-section as well, i.e. the length of said joint cross-section would be larger than the width of said joint cross-section.

4 (Cancelled). A pad, as in Claim 2, wherein

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a) both said two pads of said matched pair or a matched set are oriented in the same direction, i.e. the long axis of said PCB pad is in the same direction as the long axis of said device pad, and similarly the short axis of said PCB pad is in the same direction as the short axis of said device pad.

5 (Cancelled). A pad, as in Claim 3, wherein

a) said short axis of each one of said two pads is in line with a thermal deformation ray, which would start at the thermal center or the fixation point of said device and would emanate towards the center of said pads.

6 (Cancelled). A pad, as in Claim 5, wherein

a) said short axis of each one of said two pads is approximately in line with a ray, which would start at the thermal center or the fixed point of the device and would emanate towards the center of said pad, and could be within a few degrees off from said ray.

7 (Cancelled). A solder joint, joining pads on a PCB and pads on a device, wherein

a) said joint has an elongated cross-section, whereby one main axis of said cross section is longer than the second axis of said cross section, and whereby said long and said short axes are approx. perpendicular to each other.

8 (Cancelled). A solder joint as in claim 7, whereby

a) said solder joint is oriented such that said short axis of said joint cross section is approximately in line with the thermal deformation ray emanating from the thermal center of said device or from the fixation point of said device, and reaching towards the geometric center of said solder joint cross section.

9 (Cancelled). A solder joint as in claim 7, whereby

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a) said solder joint has an approximately uniform cross-section along its entire height, except at the bases where there may be a fillet, to look like a uniform cross-section solder column.

10 (Cancelled). A solder joint as in claim 7, whereby

a) said solder joint has a smaller cross-section at about the middle of its height, than the cross-section near its bases, which are near the device pad or near the PCB pad.

11 (Cancelled). A solder joint as in claim 7, whereby

a) said solder joint has a smaller cross-section at about the middle of its height, than the cross-section near its bases, which are near said device pad or near said PCB pad, i.e. like an hour-glass shape or a Mae West shape.

12 (Cancelled). A Method of creating an assembly, where said assembly consists of a device attached to a PCB by a joining means, where said means is attached to joining pads on said device and said PCB, whereby

a) a spacer is introduced between said device and said PCB, to control the distance between said device and said PCB.

13 (Cancelled). An assembly, as in claim 12, whereby

a) said spacer is a part of said joining means.

14 (Cancelled). An assembly, as in claim 12, whereby

a) said spacer is not a part of said joining means.

15 (Cancelled). An assembly, as in claim 12, whereby

a) said spacer changes its size during the assembly process.

16 (Cancelled). An assembly, as in claim 15, whereby

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a) said change in size of said spacer is non-linear.

17 (Cancelled). An assembly, as in claim 15, whereby

a) said change in size of said spacer is achieved through an external means.

18 (Cancelled). An assembly, as in claim 15, whereby

a) said change in size of said spacer is achieved by controlling and changing its temperature during the assembly process.

19 (Cancelled). An assembly, as in claim 12, whereby

a) said joining means is a solder joint.

20 (Cancelled). A leadframe blank, to be used in creating a leaded electronic package having more than one leg, whereby,

a) said leadframe blank in its flat unfolded form, has each leg blank, which will create the individual legs of said package, oriented along its respective thermal deformation ray, wherein each said ray starts at or near the thermal center of the said package, and emanates in the direction going towards the geometric center of said leg column cross-section, or towards the axis of said leg column, after said leg blank would have been folded to create said leg column into its working shape and position.

21 (Cancelled). A leadframe blank, as in claim 20, whereby

b) said leg blank starts near the outline of said package in a direction that is normal to the sides or centerlines of said outline of said package and then, while said blank is still flat, said leg blank curves at its neck and then the subsequent portion of said leg blank continues in a direction of its respective thermal deformation ray, wherein said ray starts at or near the thermal center or fixation point of said package, and emanates in the direction going towards the geometric center of said leg column cross-section, or towards the axis of said leg

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column, after said leg blank would have been folded to create said leg column into its working shape and position.

**22 (Cancelled).** A pad on an electronic device, similar to pads used to join such devices to each other or to substrates, wherein

said pad is **formed in a certain shape**, so as to **influence** and control the shape and cross-section of the connection or joint that will be formed on top of it.

**23 (Cancelled).** A pad, as in Claim 22, wherein

said pad is **elongated**, with the pad length larger than the pad width, with a long axis in the general direction of the pad length and a short axis in the general direction of the pad width.

**24 (Cancelled).** A pad, as in Claim 22, wherein

said pad is **elongated**, in order to **influence** and control the shape and cross-section of the joint that will be formed on top of it, so that the joint cross-section will have an elongated shape as well, so that the length of said cross-section will be larger than the width of said cross-section, with a long axis in the general direction of the pad length and a short axis in the general direction of the pad width.

**25 (Cancelled).** A pad, as in Claim 24, wherein

said pad is **oriented** in a way that said short axis is **in line with a ray**, which starts at the thermal center or the fixation point of said device and emanates towards the center of said pad.

**26 (Cancelled).** A pad, as in Claim 24, wherein

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said pad is **oriented** in a way that said short axis is **approximately in line** with a ray, which starts at the thermal center or the fixation point of the device and emanates towards the center of said pad, and could be within a few degrees off from the direction of said ray.

**27 (Cancelled).** A **joining means**, provided on a pad of a device or a substrate, wherein said pad is **as described in claim 24**, so that said pad would **influence** and control the shape and cross-section of the joining means that will be formed on top of said pad, wherein the joining means cross-section will have an elongated shape as well, wherein the length of said cross-section will be larger than the width of said cross-section, with a long axis in the general direction of the pad length and a short axis in the general direction of the pad width.

**28 (Cancelled).** A **joining means**, as in claim 27, wherein said joining means has an **elongated cross-section**, wherein the cross-section length is larger than the cross-section width, with a long axis in the general direction of the cross-section length and a short axis in the general direction of the cross-section width.

**29 (Cancelled).** A **joining means**, as in claim 28, wherein said long and said short axes are **approximately perpendicular** to each other.

**30 (Cancelled).** A **joining means**, as in claim 28, wherein said joining means is **oriented** in such a way that said short axis of said joining means cross section is **in line** with a ray emanating from the thermal center or from the fixation point of said device, and reaching towards the center of said joining means cross section.

**31 (Cancelled).** A **joining means**, as in claim 28, wherein said joining means is **oriented** in such a way that said short axis of said joining means cross section is **approximately in line** with a ray emanating from the thermal center or from the fixation point of said device, and reaching towards the center of said joining means cross section, and could be within a few degrees off from the direction of said ray.

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32 (Cancelled). A **joining means** as in claim 28, whereby  
said joining means has a generally **uniform cross-section** along its entire height, to look  
like a column with uniform cross-section.

33 (Cancelled). A **joining means** as in claim 28, whereby  
said joining means has a generally uniform cross-section along its entire height, to look  
like a column with uniform cross-section, except at the bases where there **may be a fillet**.

34 (Cancelled). A **joining means** as in claim 28, whereby  
said joining means has a **smaller** cross-section at about the **middle** of its height, than the  
cross-section near its bases, which are near the device pad or near the substrate pad.

35 (Cancelled). A **joining means** as in claim 28, whereby  
said joining means has a smaller cross-section at about the middle of its height, than the  
cross-section near its bases, which are near said device pad or near said substrate pad, and  
looks like an hour-glass shape or a **Mae West shape**.

36 (Cancelled). A **joining means** as in claim 28, wherein  
said joining means comprises a **solder material**.

37 (Cancelled). A **joining means** as in claim 28, wherein  
said joining means comprises a **conductive adhesive glue**.

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**38 (New).** A **pad**, similar to pads used to join electronic devices to each other or to substrates, provided on an electronic device,

said device having a **first device surface**,

said device having a **number of such pads** arranged on said first device surface,

said pad having an **elongated shape**, with the **pad length larger than the pad width**, with a **pad long axis** in the general direction of the pad length and a **pad short axis** in the general direction of the pad width,

said pad long axis and said pad short axis **intersecting generally near the pad center**, wherein

said pad is **oriented** in a way that said **pad short axis** is generally **in line with a ray**, which starts at the **geometric center** of said device and **emanates towards said pad center**, and could be **within a few degrees off** from the direction of said ray.

**39 (New).** A **pad**, as in Claim 38, wherein

said pad is **oriented** in a way that said **pad short axis** is generally **in line with a ray**, which starts at the **thermal center** of said device and **emanates towards said pad center**, and could be **within a few degrees off** from the direction of said ray.

**40 (New).** A **pad**, as in Claim 38, wherein

said pad is **oriented** in a way that said **pad short axis** is generally **in line with a ray**, which starts at the **fixation point** of said device and **emanates towards said pad center**, and could be **within a few degrees off** from the direction of said ray.

**41 (New).** A **joining means**, similar to joining means used to join electronic devices to each other or to substrates, provided on an electronic device,

said device having a **first device surface**,

said device having a **number of such joining means** arranged on said first device surface,

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said joining means having a certain **height** above said first device surface, to look like a **column**, and having a **cross-section**,

said cross-section having an **elongated shape**, with the **cross-section length** being **larger than the cross-section width**, with a **cross-section long axis** in the general direction of said cross-section length and a **cross-section short axis** in the general direction of said cross-section width,

said cross-section long axis and said cross-section short axis **intersecting** generally near the **cross-section center**,

**wherein**

said **joining means** is **oriented** in a way that said cross-section **short axis** is generally **in line with a ray**, which starts at the **geometric center** of said device and emanates towards said **cross-section center**, and could be **within a few degrees off** from the direction of said ray.

42 (New). A **joining means**, as in claim 41, wherein

said **joining means** is **oriented** in a way that said cross-section **short axis** is generally **in line with a ray**, which starts at the **thermal center** of said device and emanates towards said **cross-section center**, and could be **within a few degrees off** from the direction of said ray.

43 (New). A **joining means**, as in claim 41, wherein

said **joining means** is **oriented** in a way that said cross-section **short axis** is generally **in line with a ray**, which starts at the **fixation point** of said device and emanates towards said **cross-section center**, and could be **within a few degrees off** from the direction of said ray.

44 (New). A **joining means**, as in claim 41, wherein

said **cross-section** is **rectangular** in shape.

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**45 (New).** A **joining means**, as in claim **41**, wherein  
said joining means has a generally **uniform cross-section** along its entire height, to  
look like a column with uniform cross-section.

**46 (New).** A **joining means**, as in claim **41**, wherein  
said joining means has a generally uniform cross-section along its entire height, to  
look like a column with uniform cross-section, except at the bases, which are near the device  
or near the substrate, where there may be a fillet.

**47 (New).** A **joining means**, as in claim **41**, wherein  
said joining means has a **smaller cross-section** at about the **middle** of its height, than  
the cross-section near its bases, which are near the device or near the substrate.

**48 (New).** A **joining means**, as in claim **41**, wherein  
said joining means has a smaller cross-section at about the middle of its height, than  
the cross-section near its bases, which are near the device or near the substrate, and has an  
hour-glass shape or a Mae West shape.

**49 (New).** A **joining means**, as in claim **41**, wherein  
said joining means comprises a **solder material**.

**50 (New).** A **joining means**, as in claim **41**, wherein  
said joining means comprises a **conductive adhesive material**.

**51 (New).** An **electronic device**  
having a **first device surface**,  
and having a number of **pads**, similar to pads used to join such devices to each other  
or to substrates, arranged on said first device surface,

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each one of said pads having an **elongated shape**, with the **pad length** larger than the **pad width**, with a **pad long axis** in the general direction of the pad length and a **pad short axis** in the general direction of the pad width,

said pad long axis and said pad short axis **intersecting** generally near the **pad center**,  
**wherein**

each one of said pads is **oriented** in a way that said pad **short axis** is generally **in line with a ray**, which starts at the **geometric center or thermal center or fixation point** of said device and **emanates towards said pad center**, and could be **within a few degrees off** from the direction of said ray.

**52 (New).** An electronic **device**, as in claim 51,

**Wherein**

said device will be joined to a second device, similar to said first device,  
said second device having pads, similar to the pads on said first device,  
and wherein each pad on said first device will match a corresponding pad on said second device, so as to create matched sets of pads and matched sets of devices.

**53 (New).** An electronic **device**,

having a **first device surface**,

and having a number of **joining means**, similar to joining means used to join such devices to each other or to substrates, arranged on said first device surface,

each one of said joining means having a certain **height** above said first device surface, to look like a **column**, and having a cross-section,

said **cross-section** having an **elongated shape**, with the cross-section **length** being **larger than** the cross-section **width**, with a cross-section **long axis** in the general direction of said cross-section length and a cross-section **short axis** in the general direction of said cross-section width,

said cross-section long axis and said cross-section short axis **intersecting** generally near the **cross-section center**,

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each one of said **joining means** is **oriented** in a way that said cross-section **short axis** is generally **in line with a ray**, which starts at the **geometric center or thermal center or fixation point** of said device and emanates towards said **cross-section center**, and could be **within a few degrees off** from the direction of said ray.

54 (New). An electronic device, as in claim 53,

**Wherein**

said **cross-section** is **rectangular** in shape.

55 (New). An electronic device, as in claim 53,

**Wherein**

said joining means has a generally **uniform cross-section** along its entire height, to look like a column with **uniform cross-section**.

56 (New). An electronic device, as in claim 53,

**Wherein**

said joining means has a smaller cross-section at about the middle of its height, than the cross-section near its bases, which are near the device or near the substrate, and has an hour-glass shape or a **Mae West shape**.

57 (New). An electronic device, as in claim 53,

**Wherein**

said joining means comprises a **solder material**.

58 (New). An electronic device, as in claim 53,

**Wherein**

said joining means has a member inside the joining means material, and wherein said member has a higher melting temperature than that of said joining means material, and said

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member has a smaller size than said joining means cross-section.

A handwritten signature in black ink that reads "Gabe Cherian". The signature is written in a cursive, flowing style.

Gabe Cherian.